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ABSTRACT

This paper reviews and uses current research to present guidelines for curriculum development and delivery. The presenters demonstrate why manipulatives, laboratories and other "hands on" approaches are not appropriate introductory learning tools for adults. They argue that laboratory and similar strategies are the tools of an industrial-business-education complex which has technologically modified the concept of an education and subjugated the people of the United States by conditioning them to believe that acquiring a vocational skill is the purpose of education. The authors contend that the concept of education was modified to divert the costs of employee training to the public sector and to prepare technological drones for particular industries. The purpose of this paper is to stimulate discussion concerning the role of education in the future and encourage educators to take an assertive and aggressive role to shape a direction that serves the broad societal needs while supporting, not supplanting, the obligation of the private sector to train employees. Contains approximately 375 references. (GLR)

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Curriculum Directions For The Next Millennium

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Curriculum Directions For The Next Millennium

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Curriculum Directions For The Next Millennium

ABSTRACT

This paper reviews and uses current research to present guidelines for curriculum development and delivery. The presenters demonstrate why manipulatives, laboratories and other "hands on" approaches are not appropriate introductory learning tools for adults concluding that laboratory and similar strategies were the tools of an industrial-business-education complex which technologically modified the concept of an education and subjugated the people of the United States by conditioning them to believe that acquiring a vocational skill is the purpose of education. The authors contend that the concept of education was modified to divert the costs of employee training to the public sector and prepare technological drones for particular industries. The purpose of this paper is to stimulate discussion concerning the role of education in the future and educators to take an assertive and aggressive role to shape a direction serving broad societal needs which support not supplant the obligation of the private sector to train employees.

Curriculum Directions For The Next Millennium

Upon the occurrence of each millennium the minds of men and women project a hologram: the past thousand years and images of the thousand years yet to come; thoughts of extreme possibilities, fantasies which vacillate between paradise and armageddon. Each millennium has seen the death of old history and the birth of a new vision of life. Fifty generations ago, life on this planet was primitive when judged by today's standards and this time will also be so judged after fifty generations

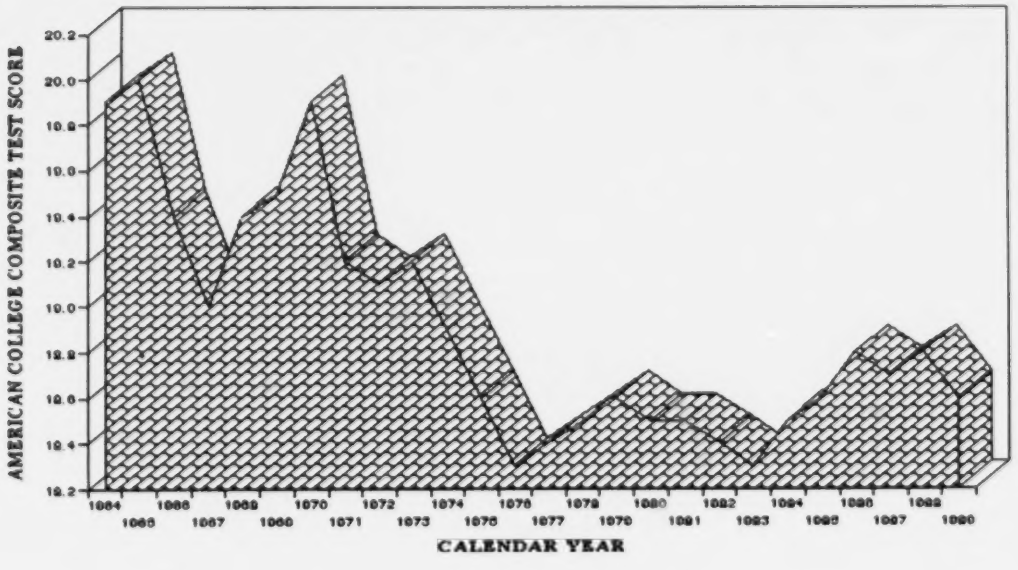
Today, time travels at light speed. At the beginning of this millennium time traveled at oxen speed. Existence was defined by the environment and superstition where the observable forces of nature and tenants of religion defined reality. It was a time when there was no agreement when the new year started (i.e. 1 January or 15 March) and terror stalked the night. Children were workers; childhood and schooling did not exist; until *circa 1800*, a feudal system and shortage of labor demanded that the young wed and bear children as soon as they were of age (13 to 15 years). *Circa 1300*, the *convivencia* era, European scholars visited Muslim Spain to learn Arabic literature, astronomy and medicine which, coupled with the influence of the Hellenic scholars, led to the Renaissance through classical studies and the European Christians became acquainted with the trappings of culture such as food cooked in oil, spices, literature, art and music. In 1492 the Christian establishment demanded that Jewish scholars and ironsmiths either convert to Christianity or enter exile in Ghettos (iron foundries) and the Jews, primary translators of Arabic and Greek scholarship, rediscovered the geography of Ptolemy which led to the Age Of Discovery and discovery of the Americas. By 1500, millions of books were in print and in 1609 Galileo had confirmed the speculations of Copernicus; 1620, Bacon introduced inductive reasoning and logic; 1700, Descartes and Newton conceived of a pragmatic science leading to the industrial revolution. The evolution of the "practical arts" in Europe catalyzed the development of a third world nation developing in the Americas into a technological giant and the evolution of a system of education founded, in part, upon the traditions dating back to A.D. 528 when St. Benedict codified schooling under the 73 articles of the Rule of Benedict including reading, church history and canonical law as well as Charlemagne's first private school for the sons of noblemen in *circa* 830.

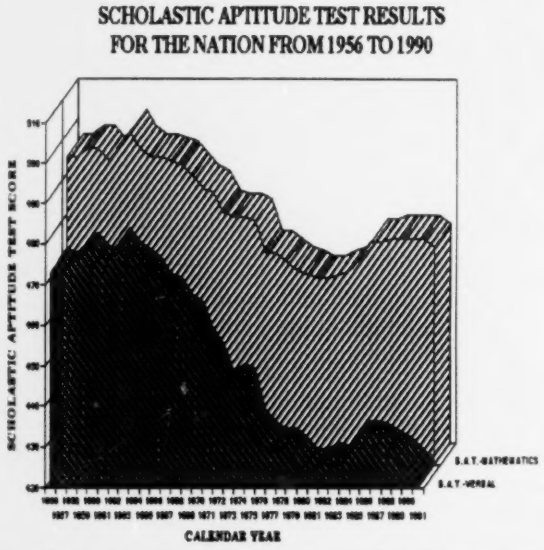
Education in the United States grew rapidly between 1800s and 1900s where the main responsibility of educational managers had been to organize the school curriculum but, by the late 1800s, the influx of immigrants into the United States resulted in a rapid increase in numbers of students shifting attention from organization and curriculum to seeking ways to accommodate large numbers of students (Hashway, 1988). The percent of fourteen to seventeen year olds attending high school ranged from 7 in 1840, 11 in 1900, 30 in 1920 and over 51 in 1930. As time marched on cities grew and an identifiable single value structure in any particular city was nonexistent. Education became a mediator between the family and an impersonal societal ordering system where family structures, becoming unstable, were not considered enough to train an individual for the industrial society.

High school principals complained that different colleges had different entrance standards and because half of the graduating class went on to college a new standard curriculum was required to meet the needs of the "nontraditional student" (Eliot, 1892a, 1892b, 1905, 1908): *no amount of study in language, natural sciences or arithmetic could protect a man or woman from succumbing to the first plausible delusion or sophism he or she may encounter* (Eliot, 1892b, p. 423). Eliot believed that the ability to express thoughts "clearly, concisely and cogently," the power to reason, moral character and appreciation of beauty were the purposes of an education. The National Education Association (1893) published its "Cardinal Principles" stipulating that education for life is education for college and that colleges should accept a good education for life as preparation for college studies.

G. Stanley Hall (1904) focusing upon the *"great army of incapables shading down to those who should be in schools for the dullards or subnormal children"* (p. 510) attacked a uniform curriculum as an attempt to impose college domination upon the high school. Eliot (1905) saw that a differentiated curriculum would determine the social and occupational fate of students rather than their capacities and William Torrey Harris (1880, 1886, 1888, 1896a, 1896b, 1898a, 1898b) pointed toward vocational training as imposing the values of an industrial society and he contended that the purpose of an education was to convey the Western cultural heritage and that each social institution (family, church, industry and school) had a social role. Harris was a leader in moving education from a teacher directed activity to a curriculum directed activity establishing the curriculum and the entire education process as a molecule in the great social milieux.

AMERICAN COLLEGE COMPOSITE TEST RESULTS FOR THE NATION FROM 1964 TO 1989





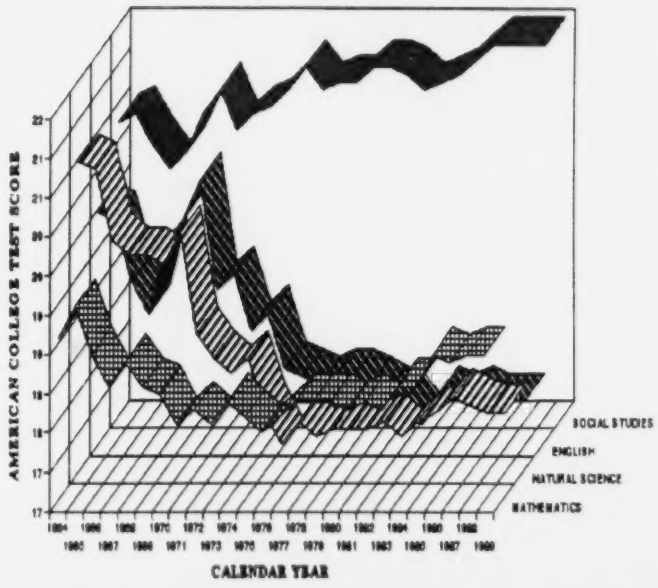
Curriculum was in a state of flux. The Platoian and Aristilean concepts of mental discipline and a "natural" learning hierarchy formed the organizing curriculum principles (Wolff, 1740). The purposes of education were to discipline and furnish the mind ('Original Papers', 1829) where drill and recitation was predicated upon the "mind is a muscle to be exercised" philosophy (Turbyne, 1962). American educators were interested in the Germanic (Herbartian) concept of education emboding the standard virtues and community values while maintaining discipline for the disorderly and the "dull witted." In 1892 a group of educators who studied in Germany (G. Stanley Hall, John Dewey, Charles DeGamo, etc.) established the Herbart Society for the 'scientific' study of education and Leonard Ayres (1909) and Joseph Rice (1893a, 1893b, 1912) led the movement toward *Scientific Management in Education* (Rice, 1912) guided by Social Control Theory (Ellwood, 1914; Finney, 1928; Ross, 1901; Snedden, 1912, 1915, 1916, 1919, 1921, 1925), believing that *Society is always in the presence of the enemy* (Ross, 1901, p. 190) and that massive intervention and control processes were needed to preserve the society. Frederick Taylor's (1919) scientific management theory gained momentum in steel industry (Plunkett & Attner, 1986) and Warrett Charters (1923) and Franklin Bobbit (1918; 1920; 1924) introduced *scientific curriculum development* using Taylor's methods to decide what to teach (Kliebard, 1987; McNeil, 1977; Tyler, 1949) which resulted in textbooks that stressed skills related to the everyday needs of children and adults.

Eclectic literacy was challenged by Leonard Ayres (1909) who published *Laggards in Our Schools* and contended that: *...our courses of study as at present constituted are fitted not to the slow child or to the average child but to the unusually bright one...the college preparatory curriculum needed to be replaced by a curriculum attuned to the needs of a new population and a new industrial order...in the country as a whole about one-sixth of all the children are repeating and we are annually spending about $827,000,000 in this wasteful process of repetition in our cities alone.* (p.5). Ayres developed an index of school efficiency in order to determine the *relation of the finished product to the raw material* which, when coupled with Taylor's (1911) principles of scientific management, led to the adoption of the principle of *The Elimination of Waste In Education* (Bobbitt, 1912, 1918, 1922, 1924, 1926, 1931, 1939, 1946) and the concept of *the superintendent of schools as an "educational engineer" and the school as a "plant."* Bobbitt proposed a system of *education according to need.*

Educators, concerned with the problem of servicing large numbers of students, allowed a leadership abyss to develop and a self serving Black Hand to assume control and

direction. While educators concerned themselves with counting pupils in individual classrooms, the Black Hand moved the entire system of education from producing a nation of literate citizens to producing a nation of drones for the factories. Education changed from a vehicle for protecting individual freedom to a means to a job. In fact, the purpose of the entire nation was shifted from providing freedom of thought and expression to providing security and employment.

AMERICAN COLLEGE SUBTEST RESULTS
FOR THE NATION FROM 1964 TO 1989



THE BLACK HAND

Industrial and financial Czars, the Black Hand (Sinclare, 1926), controlled the development of education in the United States for personal profit and molded the curriculum so that there would always be an underclass with the modicum of education necessary to perform low level functions in their shops or businesses in sufficient numbers to increase competition, hence, reducing labor costs and unable to see that they were being used.

> *Next came John H. Francis, and he had a wonderful idea. He was going to have junior high schools all over the city, and the youngsters were to have stenography and typewriting and bookkeeping and manual training-perfect little clerks and shop foremen turned out in two or three years! Francis was a man with a passion for education, a wonderful platform orator; he got his junior high schools, and the fame of them spread all over the United States. But they cost a pile of money, and they didn't perform the wonders which the business men had hoped for; instead, they got the youngsters interested in music and art and dramatics and debating-and got them organized, so that you couldn't take these things away from them without a riot! So the Black Hand lost all their enthusiasm for Superintendent Francis, and they fired him.* (Spencer, 1926, p. 23).

Carnegie Libraries were built by the Black Hand as monoliths to constantly remind the citizens of the cities where his employees lived and worked of their presence and influence at a constructin cost of tens of millions of dollars but not a penny for books! Spencer documented the influence of the Black Hand in every major city in this nation. The people may have changed but, the Black Hand still influences the direction of education in the United States toward the pecuniary interests of business and finance.

Bobbitt (1912) exalted the school system developed in Gray, Indiana a "city having been practically created by the United States Steel Corporation" (p. 259) called the

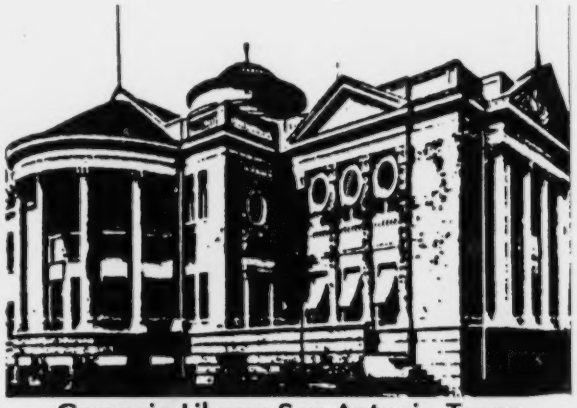
"platoon system" where *the educational engineer at Gary was to formulate a plan of operating his plant during school hours at 100 percent efficiency* (pp. 260-261). The predominant thought of the time concerning curriculum was: *Work up the raw material into that finished product for which it is best adapted...Educate the individual according to his capabilities. This requires that the materials of the curriculum be sufficiently various to meet the needs of every class of individuals in the community; and that the course of training and study be sufficiently flexible that the individual can be given just the things that he needs.* (Bobbitt, 1912, p. 269). Horace Mann had showdown with a group of Boston school masters where Mann wanted a curriculum that made sense to students, taught in a way that stimulated curiosity and intellectual independence contrasted with the school masters who wanted traditional curriculum taught in traditional authoritarian ways (Cohen, 1990; Cremin, 1957). Social efficiency was the process of scientifically attuning the curriculum to the requirements of the new industrial society led by the Black Hand.

Carnegie Library Gloversville New York

Vocational Education. In the seminal study of vocational education Dr. Susan M. Kingsbury (1906) found that manufacturers, farmers, representatives of labor unions and school officials indicated general agreement between the "broader-minded students of education' on the one hand and, on the other, those "men and women who have been brought into intimate contact with the harder side of life"; the "old-fashioned" curriclum was far too removed from the demands of life created by an industrial society and that in practical trade training could be found:

- the fullest development of the individual;
- the reformation of the wayward and vicious; and,
- elevate the Black race in the south.

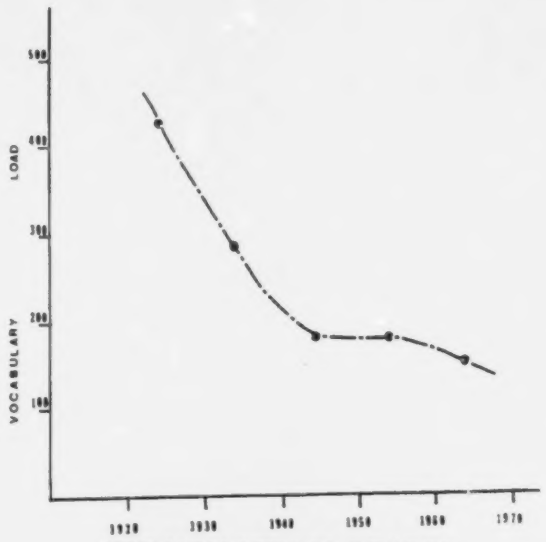
The Black Hand indicated to the Commission that: *"the processes of manufacture and construction are made more difficult and more expensive by a lack of skilled workmen"*. (Kingsbury, 1906; p. 4). The Commission approved the establishment of a new system of education tied to the *callings in life...professional, commercial, productive and domestic* (Kinsbury, 1906, p. 14) was needed and the



Carnegie Library San Antonio Texas

decline of the apprenticeship system made change a social necessity.

> *Whereas at one time, the report argued, the system of schooling and the institution of apprenticeship were kept in a kind of balance in terms of their influence on youth, that balance had now been destroyed to the point where a dangerous bias had been created with children and youth devoting their time exclusively to academic studies in school. That balance could be rectified by restructuring the curriculum in schools to include the functions once performed by the apprenticeship system.* (Kliebard, 1989, p. 101).



PRIMARY SCHOOL READER VOCABULARY LOAD

The leadership of the organized labor unions believed that an ideal was the creation of their own schools that would serve in place of the old apprenticeship system. The Black Hand made sure that there would be a lack of enthusiasm on the part of the rank and file for that ideal. The Black Hand became so influential that President Theodore Roosevelt found the American school system:

> *wellnigh wholly lacking on the side of industrial training, of the training which fits a man for the shop and the farm...We of the United States must develop a system under which each individual citizen shall be trained so as to be effective individually as an economic unit, and fit to be organized with his fellows so that he and they can work in efficient fashion together.* (Roosevelt, 1907, p.6).

The early debates reflect uncertainty concerning the form that vocational education should take. Social Efficiency was used by the Black Hand because it afforded the prospect of 'scientifically' attuning the curriculum to industrial and business needs.

SOCIAL MELIORISTS

Lester Ward (1883, 1893) led a movement which included the educational lumanists John Dewey (1896, 1897, 1898, 1899, 1900, 1909) and Herbert Spencer (1865). They believed that: *The denizens of the slums are not inferior in talent to the graduates of Harvard College...Criminals are the geniuses of the slums. Society has forced them into the field, and they are making the best use they can of their native abilities.* (Ward, 1893, p. 290). They thought that important curricula questions concerned the theories which give some principle and philosophy to the various subjects: *To study history is not to amass information, but to use information in constructing a vivid picture of how and why men did thus and so; achieved their successes and came to their failures.* (Dewey, 1900, p. 199). They believed that systematic grouping of students and selection of teachers served to maintain the existing reward system and that meaningful reform was impossible and contended that a system for social progress was a distribution of the culture through

a system of education. They did not imply that education should be a state supported institution in the sense of a school or school building and raised an interesting debate which rages to the current time.

> *A sad snare would these advocates of legislative teaching betray themselves into, could they substantiate their doctrine. For what is meant by saying that a Government ought to educate the people? Why should they be educated? What is the education for? Clearly to fit the people for social life-to make them good citizens. And who is to say what are good citizens? The Government: there is no other judge. And who is to say how these good citizens may be made? The Government: There is no other judge. Hence the proposition is convertible into this-a Government ought to mould children into good citizens, using its own discretion in settling what a good citizen is, and how the child may be molded into one. It must first form for itself a definite conception of a pattern citizen; and having done this, must elaborate a system of discipline which seems best calculated to produce citizens after that pattern. This system of discipline it is bound to enforce to the uttermost. For if it does otherwise, it allows men to become different from what in its judgement they should become, and therefore fails in that duty it is charged to fulfil.* (Spencer, 1865, p. 158-159).

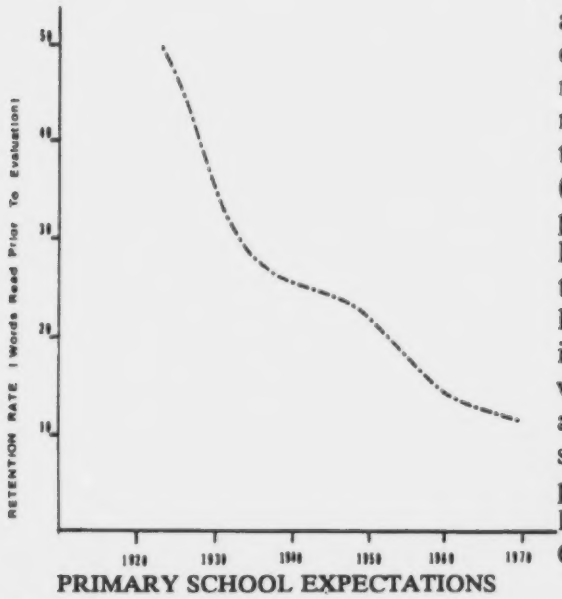
The social meliorists further contributed to the institutionalization and bureaucratization of education moving it further from the control of the academy.

The Curricula Malaise. While the ideas of leading educators attempted to set the pace for curriculum change, social and economic events of the first half of the 1900s added to the pressure where two world wars had a tremendous impact on education by creating a new set of students-the service men supported by the GI Bill; the communications industry; De Forest's vacuum tube (1096) led to commercial radio stations (*circa* 1920); Zworykins' invention of the iconoscope (picture tube, 1923) led to experimental television (1939); and, commercial television (*circa,* 1940) and growth of the communication industry shifted the locus of control of ideas from the local magnates to the common man who could learn his environment without consulting ward bosses and the beginning of the end of the control of the common man's mind by the wealthy (Hashway, 1988).

Even though curriculum reform had become a national preoccupation (*circa,* 1930), solutions were not found to problems which were not well definable in a Nation that was in a constant state of social flux. The events that took place in quick succession caught curriculum thinkers in a web which they have not untangled to the present day.

CURRICULUM LEADERSHIP

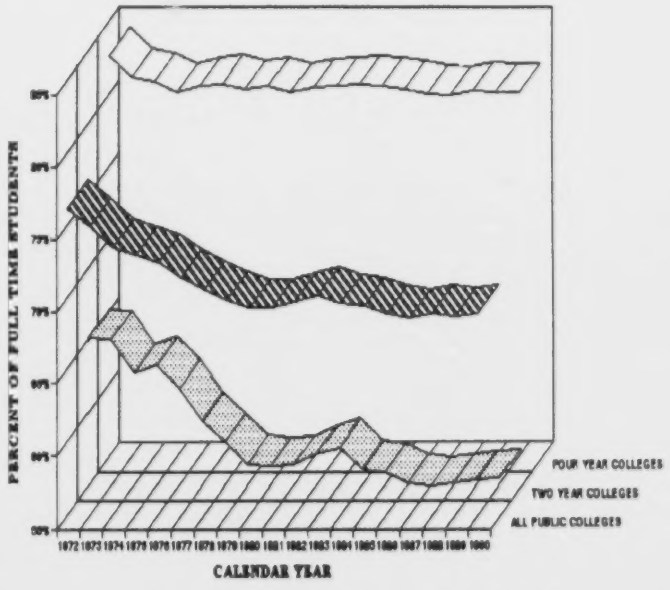
The concerns expressed at different historical periods of American education appear to point to curriculum as the only tool through which a workable system perpetuating social goals and missions can be created (Doll, 1986) but it is difficult to develop a curriculum that satisfies all of the players in the social drama. Support of education in America seems to be the *vox populi,* reports of the status of education in this country have indicated that it has educationally failed generations of Americans. High school dropout and teenage pregnancy rates are indicative of this failure and other performance indicators are in decline (Hashway, 1988, 1990). Examples of the effects of the lack of faculty leadership can be found in curriculum, the financing of public higher education



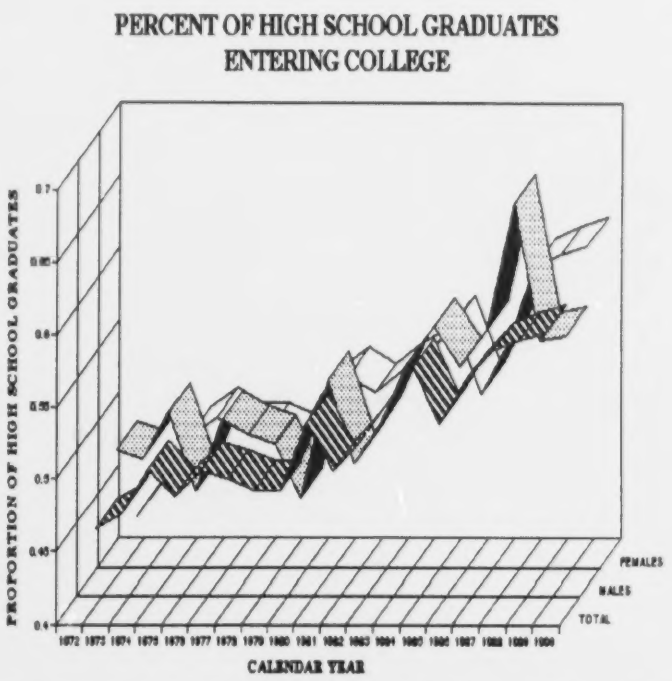
PRIMARY SCHOOL EXPECTATIONS

and a fifty year decline in the performance of students entering college. Undergraduate room and board at private institutions has nearly doubled since 1981 while public tuition has increased by a modest fifteen (15) percent and the ratio of public to private school tuition has decreased over the last fifteen years where in 1975 the cost of tuition at a public college was approximately half that at a private school (45.5%) where in 1990, the tuition cost at a public college was approximately one third (36.5%) that at a private college. Results of studies of social and economic indicators of school performance (Adler, 1982; Airasian & Madaus, 1976; Boyer, 1983; Coleman, 1966; Cicerelli, 1969; Hashway, 1988, 1990; National Governors' Association, 1986; National Institute of Education, 1984; Neill, 1977; Jackson, 1973; Jencks, 1972; Mosteller & Moynihan, 1972; Mayeske, et al., 1969; Rakow, Airasian & Madaus, 1975) serve as evidence of the validity of a theorem proposed by Horace Mann over one hundred years ago, *No educated body of men can be permanently poor*, and its lema that *any educated body of men can never be permanently poor.*

PERCENT OF FULL TIME STUDENTS IN PUBLIC COLLEGES



In the early days education was church centered, educators exercised almost absolute authority over curriculum matters (Birnbaum, 1988); modern education functions in a dynamic environment. Any curriculum reform has to take account of the plethora of demands imposed by a diverse population of nontraditional and multicultural learners. The only practical way any major curriculum reform can take place is through faculty leadership. Only when academia establishes a forum for debating national curriculum policy, a systematic mechanism for public debate as well as the financial means for

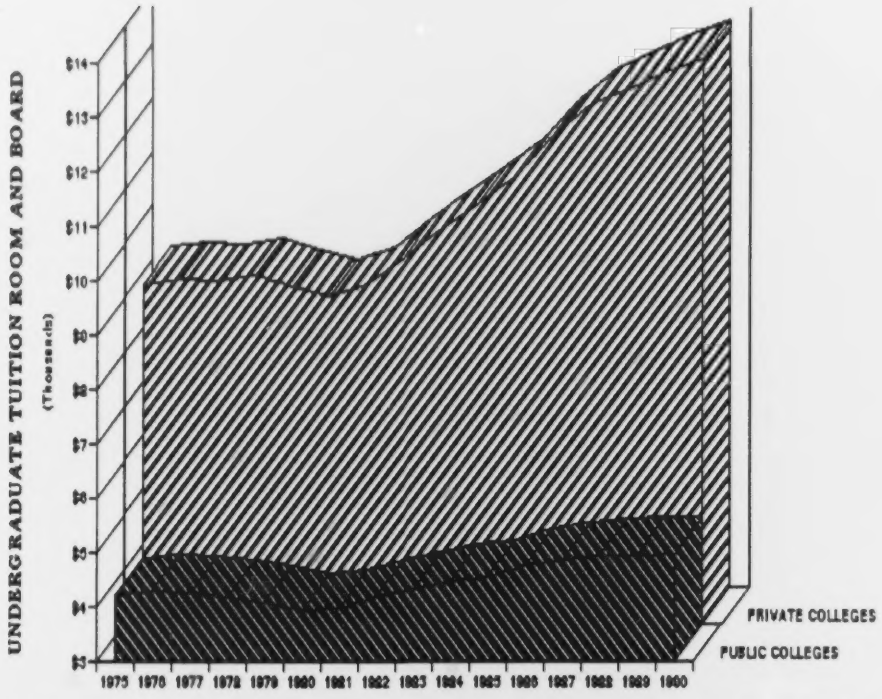


research, adult retraining, and the training of teachers can solutions be found to the plague infecting American education. Education in the United States might have been different had the academy systematically responded to the curriculum crisis rooted in the social malaise of the late 1800s. It is time that the academy involves itself with the establishment of a new and dynamic vision for the next millennium.

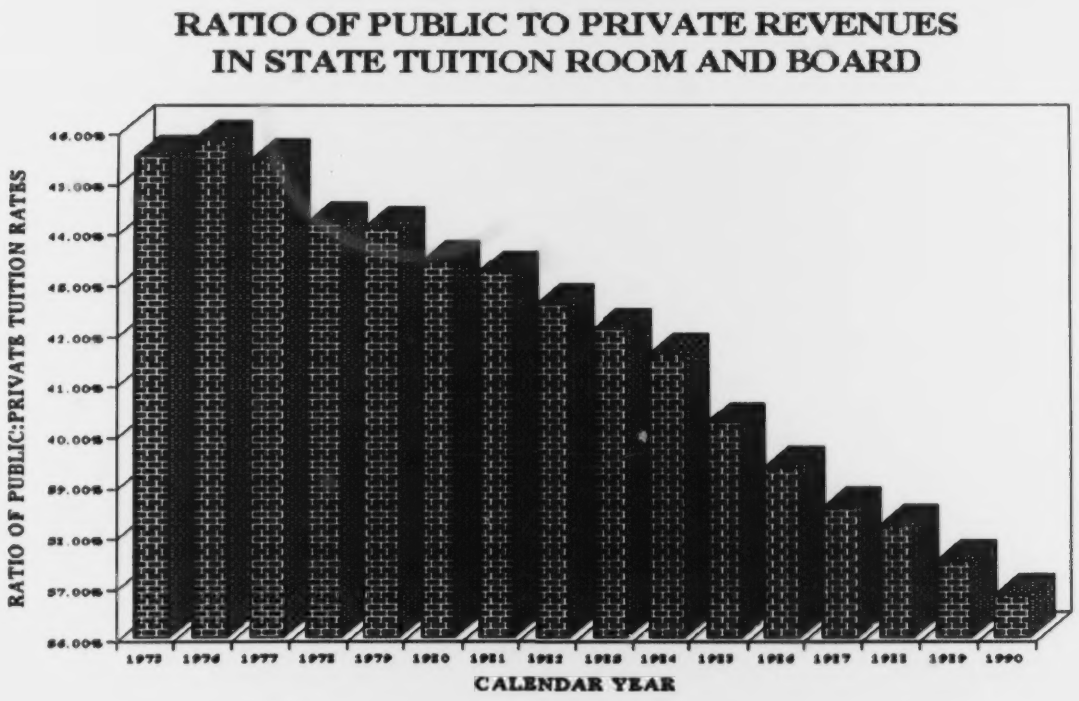
Passage through the millennial barrier is a time for reflection of events past and projection of hopes for the future. Educators MUST look at the events of the past, project into the future and define their own fate. The purpose of this paper is to look at some recent events in education in the United States and project into the future. A future which demands a restructuring of how we view the role of educators as leaders or followers of the society (Durkhiem, 1961; Mamnheim, 1952) and the very nature of education itself.

A study science and mathematics educational practices led to examining the role and evolution of the last 200 years in the United States. In the course of this adventure, many controversial concepts emerge which may excite or enrage. The spirit of the millennium is one of dynamic readjustment and change and change is difficult. As Machiavelli pointed out in The Prince, "*There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success than to take the lead in the introduction of a new order of things, because the innovator has for enemies all those who have done well under the old conditions and lukewarm defenders in those who may do well under the new.*" The academy must regain control of the destiny of the academy. Dialogue concerning the very nature, purpose and process of education must occur in each faculty lounge and washroom. The vision of the future demands a clear mission and a restructuring of the educational experience. The faculty must reinstate the fundamental purpose of education as seen by the founding fathers as producing citizens and societal leaders.

Members of the academy at all levels must rebuff practices based upon theories which meet the needs of menial vocational training and yet have been rejected in the research literature for adults and children alike (Piaget, 1971, 1959, 1954, 1950, 1932; Piaget and Inhelder, 1977; Skinner, 1966, 1964, 1958, 1955, 1949; Watson, 1924; Watson & Rayner, 1920). Although these theories have been used to develop learning systems (Bell-



Bredler, 1986; Bloom, 1976; Glaser & Nitko, 1971; Glaser, 1973; Goldchmid and



Goldchmid, 1973, 1974, 1976; Hashway, 1979, 1988; Nitko, 1968; Rysberg, 1986; Schubert, 1986) they have been found ineffective (Anderson, Reynolds, Schallert & Goetz, 1977; Ausubel, 1968; Beeson, 1977; Carey, 1985, 1986; Champagne, Klopfer, DeSena & Squires, 1981; Chi, Feltovich & Glaser, 1981; Deese, 1962; Gunstone & White, 1981; Head & Sutton, 1981; Johnson, 1964; Johnson-Laird, 1985, 1983, 1975; Linke, 1974; Novak, 1977; Novak & Gowin, 1984; Pines, 1977; Preece, 1976a, 1976b, 1978; Shavelson, 1972, 1974; Shavelson & Stanton, 1975; Stensvold & Wilson, 1990; Stewart, 1979; Strike & Posner, 1976; Trembath & White, 1979; Viemot, 1979; Vosniadou & Brewer, 1987; White, 1974, 1979a, 1979b, 1981; White & Glynn, 1990; White & Gunstone, 1980; Wisner & Carey, 1983). As Glynn, Yeany and Britton (1991) have pointed out with respect to the use of manipulatives in science and mathematics: *a trendy emphasis on "hands on" will not, by itself, increase students' understanding of science. What is additionally needed is a "mind on" emphasis in the learning of science...To test a students' understanding, they should be asked to explain these ideas. When the students' explanations are not clear, they should be required to clarify them. The students must be able to explain concepts using their own words rather than repeating the words of a textbook author. (p. 3-4).* Further evidence of the ineffectiveness of the "hands on" or manipulative approach is contained in a broad national study conducted by the General Accounting Office (1991).

The trend toward "hands on," and other existential techniques such as manipulatives in mathematics, laboratories at early levels in the sciences, engineering and linguistical studies feeds the vocational fervor in the society where the *vox populi* seems to be that the very purpose of education is to prepare individuals for a vocation (Aring, 1993; Bishop, 1992; Dewey, 1916; Reich, 1989; Samuelson, 1992; Weisman, 1993). If the purpose of education continues down the road toward vocational training, not only will students be inadequately trained for industry but the very leadership which established this nation as an industrial leader will dwindle to a cinder.

The Developmental Imperative. The "great educational debate" is similar to the distinction between the trivium, quadrivium and professional training dating back to *circa* Jarvis (1992) suggests a **paradox in being human:** *Human beings have to learn through the experience of living. In An Essay Concerning Understanding ([1690] 1977), Locke argues that human beings are born as tabula rasa-just the opposite of what Plato contends-and acquire knowledge only later...Learning is wider than education; education is only one social institution in which learning occurs, albeit the only one specifically directed toward it...These institutions exist only to facilitate the smooth functioning of the social system, and so they may often constrain learning. Without them, though, there would be a lot less opportunity for human learning and development; this is part of the paradox of being human...Learning, then, is of the essence of everyday living and of conscious experience; it is the process of transforming that experience into knowledge, skills, attitudes, values, and beliefs. It is about the continuing process of making sense of everyday experience-and experience happens at the intersection of a conscious human life with time, space, society, and relationship. Learning is, therefore, a process of giving meaning to, or seeking to understand, life experiences* (Jarvis, 1991, p. 9-11). Education in America, dominated by vocationalism, has not evolved from that of a third world nation. In the *America 2000*

plan, a program advertised as a major restructuring of the direction of education, President George Bush (1990) indicated that there was a need for fundamental change. *Nations that nurture ideas will move forward in years to come. Nations that stick to stale old notions and ideologies will falter and fail* (Bush, p. 2). Then, within ten short minutes he said: *The corporate community can take the lead by creating a voluntary private system of World Class Standards for the workplace. Employers should set up skill centers where workers can seek advice and learn new skills. But most importantly, every company and every labor union must bring the worker into the classroom and bring the classroom into the workplace* (Bush, p. 7) reverting education in the United States back to the crucible of technocracy and the leadership of the Black Hand.

We argue the need for a developmental approach to learning throughout the lifespan concordant with the current theories of developmental education (Bryson, 1933; Cross, 1971, 1976; Frazier & Armentrout, 1927; Hall, 1904; Hart, 1927; Harding, 1988; Hashway, 1988; Knowles, 1980; Liveright, 1968; President's Commission, 1947; Rouche & Snow, 1977; Sheldon, 1842). The argument will commence with a discussion predicated upon the most recent results in the fields of learning theory and neuropsychology providing the basis for the futility of pedantic 'hands on' or manipulative approaches. A program for articulating a 'mind on' approach will be described (Anderson, 1990; Bloome, 1991; Ennis, 1989; Glynn, Yeany and Britton, 1991; Marzano, 1991; Paul, 1990; Perkins, 1989; Perkins, Allen & Hafner, 1983; Rumelhart, 1981; Shiffrin & Schneider, 1977; Silver & Marshall, 1990; Vygotsky, 1978; Vosniadou & Brewer, 1987; Young & Fulwiler, 1986; Yussen, 1985) and the fundamental assumptions of curriculum content will be challenged. It is our desire to present a forum for discussion of fundamental issues in the teachers' rooms and on the campuses throughout the nation and to constructively challenge the direction of education leading to a new direction for the next millennium will evolve.

FOUNDATIONS OF THE "Mind On" CURRICULUM

Every day science and mathematics educators make choices about what to emphasize in their classroom. How much time should spent on memorization tasks? How much credit should we give to correct a process that resulted in an incorrect answer? Could time spent in a laboratory be better spent reviewing basic principles? When and where are manipulatives effective? An educator's philosophy of science and mathematics education is the basis of what, how, when, and whether or not it is taught. These views directly effect the use of manipulative or laboratory experiences. The goals of four twentieth century philosophies are mentioned here to challenge each of us to look at our teaching of science and mathematics and to better understand our teaching approaches. Those goals are the: usefulness of education to life, transmission of the cultural heritage, ability to think, and student self-direction.

The use of manipulatives in mathematics and science laboratories became a part of course instruction when the concept of education changed from preparing students to be citizens and societal leaders to preparing students for vocations. The World Book Dictionary makes this evident not by its definition, but in the use "hands on" materials.

Hands on: designed for personal participation or encouraging involvement.

Use: Skyline is a 'magnet school': that combines fast paced academic work with

hands on training for real jobs.

This misuse demonstrates the difference between *"mind on"* and "hands on," approaches toward the teaching of mathematics or science and how well industry has trained the thinking of educators. The societal need for citizens who not only possess a specific set of vocational skills but who are able to visualize the future needs of our nation implores you to implement a *"mind on"* approach.

Manipulatives, that is, "hands on" materials, were introduced into the developmental classroom to provide the image behind the "new concept," based upon the "success" of manipulatives in the elementary school setting (Goddard, 1992; Piel and Gretts, 1992). It is these assumptions concerning adult learners which characterize the difficulties of using "hands on" materials with this group of learners. For many adult learners the concept being introduced will not be a "new concept." When manipulatives were introduced for adults, conceptually material related to the existing concept was not presented, an new concept (manipulatives) was introduced. The importance of introducing structurally related concepts will be discussed in detail later.

If the student is not new to the concept they can frequently perform operations necessary to get a correct answer, and are not consciously aware of the steps. Before introducing new approaches (such as "hands on" activities), we should provide the logical sequence of steps necessary for systematically completing the problem (Hashway, 1990). Methods should be directly related to the concept since conceptual repetition enhances memory (Hashway, 1990).

A further problem exists with the use of "hands on" activities with the adult learner who cannot be treated as an elementary school student (Cross, 1987; Pelmuter & Monty, 1989). They come to the classroom with different motivating factors, therefore, teaching strategies should be appropriate. For any concept to be introduced in a setting which has as many degrees of freedom as the use of manipulatives suggests that educational concepts are not formed in hierarchially. Neuropsychological evidence supports nonlinear hierarchial approaches to concept formation.

The use of manipulatives in science and mathematics classrooms will not, in itself, increase student understanding of concepts (Glynn, Yeany, & Burton, 1991). Conceptual understanding is reflected by a student being able to state the concept in their own words. The nature of concept formation is of fundamental importance to those concerned with education. In order to educate, teach, or foster learning the educator must know how concepts are formed. The goal of this section is to provide a new way of looking at developmental learning and curriculum theory. The proposed theory, the *"mind on"* model, incorporates information processing theories and neuropsychological evidence. The model has its roots in a classical paper by Newell, Shaw and Simon (1958) and amplified in *The Axioms of Developmental Education* (Hashway, 1990).

The *"mind on"* model concerns the human processing of information. Transformations, logical rules which are applicable to sensory stimuli and resulting in accumulated knowledge, behavior patterns and experiences, are applied to the input data resulting in particular observable behaviors (rationality). Thinking in the *"mind on"* model starts at the level of the individual. The model does not postulate that individual differences do not exist, as in the S-R model, it incorporates individual differences as a

foundation of the theory. The *"mind on"* model of learning encompasses education from preschool to the postdoctoral level. The remainder of this section presents an overview of the *"mind on"* model and a general theory of knowledge. Implications of the model to developmental learning are also included.

The Developmental Learning Process

Regardless of whether we are designing programs for remediation or development, those programs must rest upon firm foundations, grounded in the theories of human learning and always remembering the importance of becoming a self learner. All educational programs must be based on cognitive growth and development processes. The theoretical and experimental basis of psychology, neurology, and cognitive science provide a human information processing model which explains human development (Anderson, 1980; Neisser, 1976; Norman, 1970; Posner and McLeod, 1982; Simon, 1979). Not only does it explain cognitive development it also serves as a basis for emotionality, intelligent machines, artificial intelligence, and expert systems. The model is more than merely a cognitive psychology and it concerns more than just neurophysiology or information processing. Hence, we call this model the *"mind on"* model based upon the *theory of developmental learning* which integrates psychology, education, neurology, human physiology, computer and information sciences.

The activation system. A human is a system in flux, activated by information and self-perpetuated once activated. Humans are personified and, indeed, defined by the characteristics of a system which is catalyzed by information. Many psychologists have postulated the existence of drives or motives to define cognitive behavior (Freud, 1922; Hull, 1952; Maslow, 1955; Rogers, 1963). Others have postulated the existence of a complexity program (Biggs, 1971). Neurological and psychological studies have localized the site in the brain for the drive for information or motivation. This area of the brain is called the *Reticular Activation System* (RAS), the interface between the base of the brain and the spinal column which is active during information processing. It supplies the instruction which tells the cognitive process to GO (Bloom, Lazerson and Hofstadter, 1985; Hebb, 1955; Hobson and McCarley, 1979; Jouvet, 1969; Ullman, 1973).

The memory system. There is considerable evidence that human memory consists of three components: short term memory (STM), intermediate term memory (ITM), and long term memory (LTM) (Bousfield and Barclay, 1950; Freedman and Loftus, 1971; Goss and Nodine, 1965; Melton and Martin, 1972; Sternberg, 1969; Winzenz and Bower, 1970). Short term memory is an area of the mind used for storing input from sensory processors where images are stored for short periods of time (less than 1 or 2 seconds) while a decision is made to, or not to, attend to the data (Hunter,1964; Miller, 1966, 1956; Neisser, 1967; Postman, 1955; Treisman, 1966). STM is located in the hippocampus region of the brain at the lower portion of the midsection of the central core (Alton, 1983; Hunt, 1976; Olton, Becker and Handelmann, 1983; O'Keefe and Nadel, 1978; Thompson, Berger and Madden, 1983; Thompson, Hicks and Shryrokov, 1980, 1983). Most people can store about 7 bits of data in STM where successive recoding of data lets us store a great deal of information in those 7 bits. Intermediate Term Memory is also located in the hippocampus (Goss and Nodine, 1965; Melton and Martin, 1972; Platt and MacWhimmey, 1983; Slobin, 1979) where information is stored for a few minutes or

whatever time it takes to make a decision. ITM is a temporary working storage area where data is identified, categorized, and modified from sensory STM input and moved into the ITM (Sperling, 1960; Turvey, 1973). Long Term Memory consists of memory traces retained for long periods of time and resides in the temporal lobes and cerebral cortex (Bousfield, 1953; Freedman and Loftus, 1971; Harlow, 1959). When we first learn something, synaptic connections are established between regions in the temporal lobes and areas in the cortex (Pellionisz and Linas, 1980, 1979; Squire, 1984, 1981). Over several years the temporal and cortexual areas interact, the memory trace is conceptually integrated with other concepts by a reorganization of the neural circuits and, when complete, the temporal connections are relegated to other tasks. The temporal area contains, primarily, procedural knowledge and the cortex contains concepts-those neural structures which define the individual as a unique human being (Cohen and Squire, 1980; Tulvin, 1972).

The human mind is significantly different from the computer. The computer consists of hardwired circuits and programs whereas of the synaptic network is simultaneously hardware and software. The synaptic network is composed of physical entities (hardware) and can be modified (Jackson, 1958/1869) based upon experience (software).

The remainder of this section discusses how the different memory organizations interact with each other to produce a conception of reality. It will be helpful to use a concept taken from computer science: the central processing unit (CPU), a device which performs all computations and controls the flow of data. Although it is useful to think of a single central processor controlling the actions of the brain there is no evidence supporting a single area of the brain acting as the controller but many central processing units active at the same time acting on the same or different data. Action takes place when a group of processors, controlling a group of functions and acting on the same data, reach a decision (Collins and Loftus, 1975; Fahlman, 1979; Hunt, 1976, 1973; Hunt and Poltrack, 1974; Levin, 1976; McClelland, 1981; Mountcastle, 1975; Mountcastle and Edelman, 1978).

Iconic thinking. A study of concept formation and the evolution of thinking from childhood through adulthood yields insight into the **developmental learning (DL) process.** The first DL stage is the formation of icons as mental images (Bruner, 1964) which exhibit form and structure. Once interpretive processes are disengaged we have a pathway into the iconic world (Huxley, 1959) and depth as well as spatial origination disappears. The iconic world is a world of pure perception which retains extraordinary detail. At the iconic stage, people are able to remember extraordinary amounts of detail. Thinking at the iconic stage is very rigid where new situations are compared with old situations on the basis of particulars (Piaget, 1932) and precise matches are required to imply equivalence. Developmental learning, at the iconic stage, does not distinguish between reality or perception and is characterized by rule-bound behavior (Piaget, 1950; Vygotsky, 1962).

The educator needs to know that when a new concept is introduced, it is being encoded at the iconic level. The concept must be presented at the conceptual level, soon followed with as much detail as possible. A new concept is followed by **Recticular Activation System** excitation-requests for new knowledge related to the concept. When

new knowledge is related to the defined concept and past knowledge, a state of negative feedback occurs and anxiety is reduced. Intense anxiety results from the presentation of uncoordinated information stored in short term or intermediate memory. **If integration does not occur in a few minutes, information is lost and learning does not occur.** Successive presentation of the same or extremely similar stimuli results in a decrease in retention (Graham, 1973; Groves and Thompson, 1973; Harris, 1943; Humphrey, 1933; Peeke and Herz, 1973; Sokolv, 1963; Syz, 1926; Underwood, 1966) and conceptual repetition will enhance memory but identical repetition will reduce retention (Anderson and Bower, 1973; Atkinson and Shiffrin, 1968; Biggs, 1969; Kintsch, Kozminsky, Strely, McKoon and Keenan, 1975; Wanner, 1974). The secret seems to be to: *diversify either the material or the methods, means, and mode of presentation sufficiently to make it seem novel and different, and, not to disguise the material so much that it seems unrelated to the topic of the lesson and/or past experience.* The **art of developmental teaching** is to organize and sequence the presentation of material in such a way that it is related to what has come before, and is sufficiently different in either presentation mode or information content to excite the Recticular Activation System-stimulate the information gathering process.

CONCEPTUAL GENERALIZATIONS

Iconic storage is very detailed and detail for detail searches are time consuming. 'Economy of storage' is reached through the generation of concepts-generalized forms of icons, not as detail rich as the icon itself. Memory integration is reached at the expense of many details. Once something is learned and placed in the temporal region, dendrites emerge from that region extending into related areas of the cerebral cortex via long columnar structures with thousands of nerves ending on a cortexual column where thousands of nerves protrude and make their way into temporal areas in the cerebellum. As more information on a topic is accumulated, neural pathways are 'grown,' interrelationships emerge between the temporal site and areas of the cortex. The growth process may span many years. At some magic point, when the learned relationship achieves 'importance' the temporal site is 'reconstructed' in the cortex and a concept is born.

A learned concept has lost much of the original detail of the icon and the rigid concrete rule bound behavior is absent. For example at seventeen, the bright student associates the word 'algebra' with algebraic manipulations. At age forty-seven that same bright student may associate the word 'algebra' with a 'branch of mathematics which deals with symbols and numbers which I knew very well (as defined by my teachers) at one time' and/or some basic formula solving skills. When asked how many bolts can be bought at $0.35 each with $176.42, the forty-seven year old former bright algebra student will solve the associated equation. The student may not write down the equation or follow all the steps presented in school, but, they will follow a proper process. A cortexual area is activated and related subcortexual networks receive the signal and automatically process the data (Bartlett, 1932; Hamilton, 1859; Kintsch, 1972; Kintsch, Kozminsky, Strely, McKoon, and Keenan, 1975; Minsky, 1975; Selz, 1922; Winograd, 1975).

An implication of the memory consolidation process is that we must provide time for

gestation. In the short term students can not be expected to understand the implications and ramifications of new information. If discovery learning is expected to result in concept formation, then a long time, perhaps years, must be provided for integration to occur and time for intellectual gestation must be included in any curriculum.

As important as gestation time is the structure of the concepts presented. Remembering that iconic images are the first to form, lessons must be structured so that elements of those icons are very similar to prior concepts and events. Never assume that material recently presented has reached the concept stage. Recently presented materials are temporal with some neural pathways extending into the cerebral cortex and new information be presented to reflect relevant iconic elements of related concepts. Neural pathways will be established only within the cortex and temporal areas. A sufficient number of pathways established within the temporal area accelerates the transfer of information into concepts and relocation to sites in the cortex.

When presenting material which is related or dependent upon material taught in the distant past, previously learned material has been conceptualized and many of the details have been forgotten. The relation between the new information and concepts previously learned may not be made by the developmental learner. The details of the prior icons must be reconstructed prior to introducing new information. Careful attention must be given to presenting details of all preconcepts so they can be incorporated then the learner is constructing a new concept.

The process of concept formation may be why researchers have obtained results invalidating a linear curriculum design and a cyclical model of learning optimization discovered (Hashway, 1988). Advanced concepts related to topics should be introduced much later than classical curriculum designs would suggest. It is necessary to form conceptualizations related to the basic concepts prior to moving on to other more advanced topics in the same area. Other topics seemingly obliquely related to prior topics should be presented in the interim. Cyclical reintroduction of topics using advanced basic skills is appropriate since topics must be temporarily then contextually and subsequently conceptually integrated.

Learning within a topical area may be linear but given the element of time for concept formation and neural pathway development, that linear organization is best represented by a helix. Since different concepts mature at different rates dependent upon prior concept and iconic development, the helixes related to different concepts would overlap in time and curriculum sequencing. What appears to be a hierarchical sequence is the ordering of conceptualization time.

CODING - Will reality please stand up!! Information is received by the senses which process that information using relational data kept in long term memory and coded data sent to the STM. Coded data correspond to the icons or concepts associated by past experiences with each piece of information in the sensory data stream. The subtle, yet important, point is that words and numbers are nothing more than representations used for communication. Numbers and words are not representative of human thought processes; humans do not process symbols. A student who does not answer a question correctly is not lacking understanding; the student has not used a representational system for communication that the teacher is willing to accept.

Education is definable as the means by which society standardizes communication. Each person can be an excellent information processor but may not apply the same schema if the stimuli are separated. Each stimulus activates a particular portion of the cortex. The combined effect of cortexual stimulations results in a particular plan of attack. Extra processes must be invoked to implement generalization. One commonly used teaching method is to allow activation to spread from a local unit to other units that represent similar concepts (Collins and Luftus, 1975). When one concept unit is activated, it will partially activate its neighbors and so any knowledge stored in the connections emanating from these neighbors will be partially effective (Hinton, McClelland and Rumelhart, 1987). Information about a complex concept is stored in memory becomes available when the concept is activated and an element that is part of a knowledge frame is able to activate the whole frame. This process is one of pattern completion: a partial stimulus pattern is matched with its representation in memory and activates the total knowledge unit.

When we are given materials to learn, reproductions in memory are different from the original materials (Bartlett, 1932; Hunter, 1964). Sensory and motor systems use different representation systems (Pellionisz and Llinas, 1980, 1979). Words are interpreted contextually and sequences of words are interpreted based upon experience (Anderson and Bower, 1973; Filmore, 1968; Kintsch, 1978; Kintsch, Kozminsky, Strely, McKoon and Keenan, 1975). Humans see the world through schema corresponding to networks formed through experience via the temporal cortexual assimilation process. Although there is a commonality of knowledge, if formal education was the only way of conveying knowledge, all people would be identical. Modification of schematic structures based upon experience explains the rich diversity of human spirit.

Students try to emulate accepted behavior patterns. Educators must continuously provide structured feedback not only indicating that s/he is incorrect; but, constructive feedback informing the student when s/he is correct. In the event of an incorrect response, feedback must be framed in terms of the correct response. Feedback focused exclusively upon an incorrect response serves no useful purpose, does not contribute to growth and is a deterrent to progress since it does not help the student make new memory associations that can enhance the process of concept formations.

Neuropsychology and the most recent studies in learning theory offer a sound basis for not introducing concepts to adult learners with manipulatives or other "hands on" approaches. The trendy emphasis on "hands on" will not, in itself, increase students' understanding. To test an understanding of concept we need to make sure that students can give clear explanations of the concept. Educators need to understand how the student is thinking so that the curriculum can directly address the misunderstanding, not providing another instructional process which may not be conceptually related to the concept being introduced, as might occur with the use of manipulatives. Learning does not take place until the student can associate and interpret what is to be learned and the process must allow time for concept development. Manipulatives confuse this process since they assume broad generalizations of newly introduced concepts. Manipulatives, used in a "hands on" and not *"mind on"* fashion creates the need for students to emulate behaviors without understanding the underlying concepts.

"Hands on" approaches to learning was used by the Black Hand to divert the costs of training from their ledgers to the public sector. The Black Hand is still using this educationally unsound technique to train their workers. The use of "Hands on" is questionable not to mention the very need for the courses such as nursing, education, biology, zoology, botany, engineering and business which make use of that approach. It is time to adopt a *"mind on"* approach founded around a developmental approach to human development.

DEVELOPMENTAL CURRICULUM CONTENT

Leadership goes beyond curricula delivery structures to the content of the curriculum itself. Local economics and politics dictating that certain courses must **not** be included in a particular local curriculum. The academy is in a position to have a world view that projects the likelihood of social situations which dictate the inclusion of certain content in the curriculum in order to prepare a citizenry to confront and adapt to those projected situations. Goals such as excellence in mathematics and science address immediate needs of the selfserving Black Hand, not a constantly changing and compensating developmental curriculum for moving the nation ahead. Developmental and compensatory educators need to help students acquire attitudes and belief structures supporting knowledge acquisition for its' own sake, **not** some transitory vocational aim. No student will develop or be remediated without a reason for learning. Unless that reason is long term, learning will be short term if at all.

Historical and Geographic Perspectives. The "new world order" has changed the global structure. Citizens of the next millennium need an appreciation of history and geography **not** a factual knowledge base of names, dates and places which can be readily accessed by computers. They need a perspective upon events, circumstances, philosophies and personalities which have led to the evolution of our world in order to enhance the quality of life and avoid catastrophes.

Comparative Religions and Philosophy. The world is not shrinking in terms of size, but it is shrinking in terms of the social interaction. McLuhan (1967) contended that we now live in a "global village," where we share our hopes, dreams and fears in a "world pool" of major proportions. A global economy is dependent not only upon fiscal issues; but, also upon a knowledge of how various cultures interpret certain words, phrases and behaviors deeply rooted in cultural heritage, religion and metaphysics. Without an understanding of those roots, a nation is likely to engage in adversary rather than conciliatory relationships. The study of comparative philosophies is a politically sensitive issue. Many of those philosophies are not strictly in concordance with the Christian ethic and knowledge of them may result in some modifications of that ethic. Regardless of the political sensitivity of the topic, the academy must have the courage to move ahead.

Science and Mathematics. Although excellence in science and mathematics are National goals there are no clear guidelines as to the specific nature of science and mathematics those goals are addressing. Is this Nation moving toward classical science? Newtonian mechanics, for example, is useful to the Black Hand but, understanding the physics of today (time reversal, relativistic mechanics, gravitation, space curvature and their application to earthly, cosmological and atomic phenomena) requires a new science curriculum **not** related to the current needs of business and industry. The academy must

address the issue of whether it wishes to achieve excellence in antiquated science and mathematics to abet the Black Hand or current mathematics and science where *virtual reality systems obsolete the laboratory and shop.* **The use of "laboratory", "hands on", "manipulative" and "shop" approaches robs humanity of its vitality for the benefit of the Black Hand.**

Culture and the Worker Bee. *Curriculum debates often center around the preparation* of individuals for gainful employment. In technological occupations the knowledge base changes every two to five years. The skills necessary for the world of work seem to be: a sense of the social self including a thirst for knowledge (self awareness, goal definition and lifelong learning), interpersonal relations (social skills), a willingness to change (adaptive behavior patterns and self confidence), questioning (critical thinking) and purposiveness (planning and forecasting). The worker of today and in the future must learn to work smarter not necessarily harder, with their mind not bodies.

The societal imperitive. The academy relegated by the Black Hand to a "pseudo leadership role" must break out of bondage by taking the dynamic role of providing visionary leadership. Now is the time to stop thinking in terms of distinct societal systems with unique functions (i.e. schools, hospitals, social services, employment security, etc.) and develop a single agency integrating all social services much as how the Joint Chiefs Of Staff coordinate the military, National Aeronautics And Space Administration coordinate extra terrestrial research, National Research Council coordinate research, etc.. Now is the time that the nation needs not to look at reforming education; but, whether or not a distinct structure exclusively meeting educational priorities is what is needed in the next century. The role of developmental educators in this process is to develop comprehensive plans predicated upon existing knowledge bases and serve as models for local debate as well as an operationalization of a vision of the future. The academy needs to address whether its role is to follow or to lead the nation and developmental as well as compensatory educators must participate. A society never plans to fail it only fails to plan. The future of this society depends upon the leadership that developmental and compensatory educators individually and collectively exhert on the vision of learning in the next millennium.

THE ECLECTIC DEVELOPMENTAL CURRICULUM SYSTEM

Evaluation results provide insight for policy and program development and evidence that curricula defined as the sum of life experiences, must provide substance and meaning with regard to one's personal life and help students operate from new assumptions allowing them to go throughout life adapting as well as acquiring skills which enhance their quality of life. Such a curriculum serves the needs of adults, the gifted, the handicapped as well as students who are poverty stricken, undereducated, lack motivation and bear the burden of a negative self concept. The solution to curricula problems requires adaptations of fundamental processes and a conceptualization of the academy as a member of a community providing services and deriving benefits from the home, family, business and industry.

This vision of developmental education is a comprehensive and coordinated effort serving the family, students and social community. The core of such a program could include comprehensive day care and preschool programs, values clarification as well as

vocational training funded by and located in the industrial sector for single parent families and families of 'rift' workers. The classroom must reflect technological realities with expanded services to all members of society. These services would include an organized program of individual and family counseling as well as a comprehensive performance based system of curriculum management which allows both students, faculty, and administrators to monitor progress on a daily basis.

Curricula problems, related to organization of the academy and its role in the social order are complex. No 'quick-fix' will suffice and solutions require a comprehensive conceptualization of the role of education in society. Developmental and Compensatory education must be seen as an organic system coordinating the resources of and serving educational, family, community as well as peer needs (Carroll, 1990; Dougherty & Hammack, 1990; Duncan, 1980; Lewis, 1985; Olson & Moore, 1982; Shanker, 1990). Developmenatal and Compensatory education must evolve into a system able to cope with growing multicultural diversity and social ferment (Boyer, 1985). as well as a comprehensive, integrated and well managed societal impact (Firestone, 1989).

Excellence Factors. Albert Shanker (1990) believes that, "*History, therefore, suggests that the traditional model of education is dependent for its success on at least three conditions: a cohesive family and societal structure; a willingness to accept educating the vast majority to a low level (and pushing them out or letting them drop out) and a small minority to a high level; and, a large supply of well-qualified teachers and since we can not or opt not to accept those axioms...we've reached the limits of our traditional model of education. Given our present and foreseeable demographic, economic, social, and educational circumstances, we can expect neither great efficiency nor more equity from our educational system*". Characteristics of effective educational programs are lower class sizes supported by more teachers with moderate salaries (Bruno, 1982; Edmons, 1975; Hashway, 1989; Levine, 1982; Ruffin, 1989; Sewell, 1972); programs designed for adult populations (Heller, 1964; Spring, 1986; Weiner, 1989); day care centers (Clayton, 1989; Heller, 1964; Spring, 1986; Weiner, 1989); improved health care (Heller, 1964; Spring, 1986; Weiner, 1989); high degrees of community support (Doss, 1983); meeting the economic needs of students (Doss, 1983); successful community work experiences (Doss, 1983); special counseling (Dougherty & Hammock, 1990); coordination of education, home and community (Dougherty & Hammock, 1990; Weiner, 1989); climates of high expectations (Clayton, 1989; Edmonds, 1979; Levine, 1982; Stedman, 1985); administrators who carefully plan the educational program, strongly support their staff as well as secure loyalty and hold both students as well as staff accountable for curricula progress (Clayton, 1989; Stedman, 1985); view parents, spouses and the extended family as clients, producers (volunteers) and consumers of direct services for themselves as well as their children or spouses and as governors, evaluators and decision makers (Fantini, 1986; Ruffin, 1989; Stedman, 1987); a high quality academic climate (Clayton, 1989; Firestone, 1989; Parish, et al, 1989); professional teaching conditions (Mackenzie, 1983; Parish et al, 1989); quality buildings which are clean and in good repair (Bruno, 1982; Mackenzie, 1983; Sewell, 1982); influence sharing among all educators, parents, churches, libraries and youth clubs (Mackenzie, 1983; Ruffin, 1989; Weiner, 1989); clearly defined and articulated goals (Bruno, 1982; Clayton, 1989; Edmonds, 1979;

Ruffin, 1989; Sewell, 1972); flexible scheduling (Ruffin, 1989); preschool programs for children of the students (Clayton, 1989; Ruffin, 1989); emphasis on the measurement of student performance (Chase & Bell, 1980; Clayton, 1989; Edmonds, 1979); staff development and inservice (Grant, 1989); curriculum management systems (Chase & Bell, 1980; Clayton, 1989; Passow, 1982); planning, management and evaluation (Chase & Bell, 1980); staff specialists (Bruno, 1982; Sewell, 1972); emphasis on time-on-task (Clayton, 1989); aggressive coordination of social and health services (Weiner, 1989); family counseling (Weiner, 1989); and, multicultural materials (Grant, 1989).

THE DYNAMIC INTERFACE

A dynamic interface where community, school, peer group and family emphasizing a coordinated and centrally managed program, impact upon the community, family, education and peer groups would be optimized is the solution. Reform should occur in three areas simultaneously: enhanced services, expanded services and inservice training. This vision will modify the way education currently operates by intensifying and supporting existing services, bringing business leaders/parents/students into the system as partners as well as beneficiaries, expanding programs, infusing a developmental learning management system and modernizing the face of the classroom.

Enhanced services. There is a need to modify how educational services are provided and managed on a day-to-day basis as well as how these services are provided to the community. In this and the next millennium computers are as common and as vital as a pen or pencil. Since computers are so prevalent in the business community, it is no surprise that computer literacy was included in the standard curriculum by the Black Hand. Computers in the classroom are not ends in themselves; they should be used to augment the learning of content (Hashway, 1987, 1989) in terms of simulations and stimulating imaginations **not** for business applications.

Expanded services. The classroom must not only be enhanced and modified; but, extended beyond the hallowed halls into the larger community. One possibility is establishing a comprehensive parenting seminar to benefit both single and two parent families. It should be directed to both students with children as well as the parents of students. Other possible services could include encounter and other types of counseling groups led by psychologists or family therapists to help a student's family that may be experiencing difficulties relating/supporting students. Autocratic management systems must be abandoned to make way for of participatory management including parents, spouses, students, business and industry leaders, professors, teachers, staff, administrators and board members. The calendar needs to be expanded to incorporate a twelve month year with a nominal 10 hour professional day. Education needs to establish capabilities in the home and facilities in the work place as well as employment and employability training programs for single parents and 'rift' workers. A program targeted at attitudinal change to improve and maintain a positive institutional climate is needed as well an extensive programs emphasizing cognitive, aesthetic and athletic skills. These services should be made available to interested students, spouses, children, faculty, parents and the community at large.

Inservice training. There have been many educational innovations in the past which

have failed to meet their goals. Some innovations have resulted in negative outcomes. The major reason for those failures has been the lack of proper planning and intensive inservice training. *Curricula problems are too important to the society as a whole not to require proper planning, management and inservice training.* When the ownership of new programs is shared, more people have a vested interest in making the program work. Systems are needed for sensitizing parents, students, spouses, professors, instructors, assistants and administrators of their roles as partners in the learning process. Participatory management as well as curriculum material development/validation and a 'value added' performance based reward system should be instituted.

Family, Peers & Friends. One of the programmatic thrusts strongly supported by the literature is that successful programs address the needs of the extended family unit including parenting seminars for students, spouses, single and multiparent families as well as expectant mothers. Other needs addressed include counseling and a series of workshops for students to discuss their roles as members of family and societal units. A curriculum which does not recognize the influences of peers upon norms, roles and values toward school and towards themselves, their family members as well as the society will not succeed. A multimedia program emphasizing the role of the individual in the group and society is needed. The academy must sponsor newspaper articles, radio talk shows and TV programs emphasizing the role friendship plays in academic support.

THE CHALLENGE

Preparation for life or the workplace depends upon a *"mind on" approach to education*: the attitudes and perceptions which catalyze information acquision, refinement, integration and extension are the meaningful uses of knowledge. Developmental or compensatory education has erroneously focused upon skill and knowledge when it should be helping students acquire the skills needed to learn and become productive members of society. Students are remedial or compensatory **not** because they have not learned how to perform particular tasks but because they do not possess the value systems and intellective processes necessary to acquire and integrate knowledge. **There are no underprepared students only a curriculum underprepared for those students.** Curriculum systems must be aimed at intellective development at all levels up to and including the

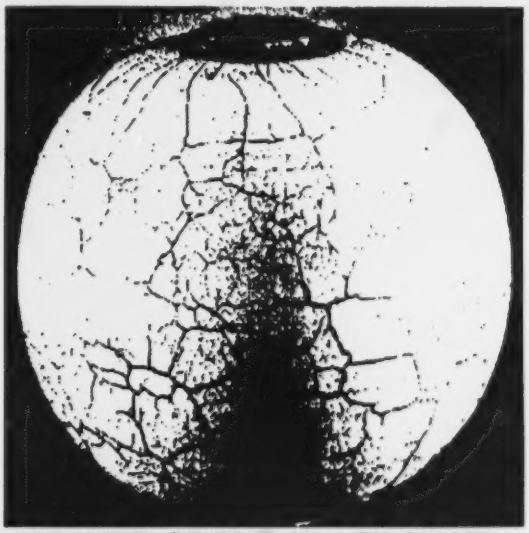
doctoral dissertation.

Developmental education is a human dynamic approach to learning intended to help people become active, critical and productive members of society (Cross, 1971, 1976; Hashway, 1988, 1990). The current concept of educational practice evolved from a time when humanity was preserved by word of mouth and needed to be stored in the mind of men (exclusively males). We now have paper, books, videotapes, and CDs to store past knowledge. The imperative of developmental education is to provide the means for people to **use** the knowledge of the past to **create** the knowledge of the future.

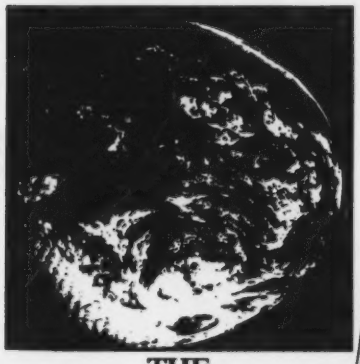
Developmental and compensatory educators must take a leadership role on their campuses and schools. For others to see the value of what they do, developmental educators must have the courage to stimulate debate and controversy focused upon the fundamental nature and purposes of education as well as how services are and could be provided. They must take the iniative toward convincing their colleagues that lifespan development wherever it is found is a developmental experience. Developmental educators must take control of their destiny not for themselves but in order to meet the needs of the next millennium.

Souls are being relegated to remedial positions in society. The future of mankind depends upon a few courageous developmental educators who will provide the leadership to move the academy into the next millennium. Humankind can use all the resources of the planet to serve the myopic and selfserving Black Hand or evolve and improve.

Humanity, the United States in particular, evolved from the primal soup by thinking of a better tomorrow for all, not the pedantic and transitory needs of a few Black Hand capitalists. Humanity will continue to evolve through the leadership of those who have the vision of a better tomorrow and the courage to challenge the greed of a powerful Black Hand.



PLANET OF THE BLACK HAND



THE DEVELOPMENTAL MILLENNIUM

Physics has helped us realize that all that was, is, and is yet to come is omnipresent (Hawking, 1989). Your future depends on you and the choices you opt to make. The shape of the next millennium very much depends upon the decisions developmental educators make today.

Do you have the courage to give up the security of the present to design the future? The academy must address fundamental issues such as:

- We must terminate laboratory and other pragmatic courses of study;
- We must emphasise a cultured approach to life and the humanities as demonstrated by projects and portfolios as a condition for graduation;
- We must make a the cultured attitudes and intellectual decorum of a genteel society as graduation requirements;
- We must remove pratical arts orientated community colleges from the collegium;
- We must require original scholarship in all of our courses and of all of our faculty regardless of the level that they may currently be employed;
- We must require the development and use of imagination and creativity in all courses;
- We must eliminate all vocationl programs of study;
- We must require community and professional service of all students and faculty;
- We must restructure funding formulas to include a percentage of faculty time for scholarship and public service;
- We must establish remote nondegree training facilities located in and funded by industry for the training of their apprentices and employees;
- We must reconceptualize the role of the academy to include an influence at every point in the lifecycle;
- We must completely redesign the undergraduate science requirements replacing courses such as physical science, biology, botany, zoology, earth science and environmental science with a solid program in theoretical physics and chemistry;
- We must emphasise the courses which build a solid culture (**abstract** mathematics, logic, sociology, psychology, history of African/Arabic/Greek/Roman/IndoChinese cultures, classical literature, Latin & Greek, Astronomy etc.).
- We must redefine our role in the larger social system and consider restructuring

governance structures: one Department of Health & Human Services effectively providing comprehensive and integrated services; the role (if any) in public educational institutions; imposing requirements on individuals who sit on governing boards and school boards.

The challenge is great but the reward is the survival of a species. At the very least, these and other issues need to be the subject of discussion in the Academy at all levels from the preschool to the postdoctorate. At the very least, let the word go forth from this place that the academy will define its mission in the next millennium with the sole purpose of developing a strong nation firm in the belief that the purpose of education is to free the soles of men from the bondage of a self serving Black Hand, their pedantic and useless laboratories, manipulatives and "hands on" approaches. Industry must bear the burden for the research and training which drains the resources and redirects the energy of educators for the sole purpose of filling the pockets of the industrialists. Education has taken on a "mind on" approach to prepare an enlightended citizenry not dupable by the Black Hand and suggests that a "hands on" approach be adopted in the industry for training and a "hands off" approach be adopted by industry towards education. Educators no longer wish to be enslaved by selfish needs of industry and leave that bondage in order to build a better nation. A nation with citizens concerned with human values and the rights of people towards each other and towards the environment which sustains them.

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CURRICULUM DIRECTIONS FOR THE NEXT MILLENNIUM

Biographies of the Presenters

Robert M. Hashway is currently a professor of education at Grambling State University. He holds degrees in electronic engineering and mathematics as well as educational research, measurement and evaluation. Dr. Hashway has been one of the leading researchers in developmental education for the past twenty five years. As a professor of physics, chemistry and electronics at Roger Williams University, he designed and developed multimedia approaches for training engineers in the use of advanced instrumentation. In 1970, he was one of the first professors in the United States to incorporate microcomputers in the classroom at the college and secondary levels. As director of developmental education for the Massachusetts State College System he developed the Nation's first multimodality computer managed developmental program to be implemented on a regionwide basis. As chief executive officer of Microware Inc. and their associated Advanced Concepts Learning Centers he developed processes to facilitate lifelong learning for executives, educators, rift employees and the underprivliged learner. He provided technical assistance to develop the only developmental education doctoral program in the United States at Grambling State University where Dr. Hashway is the ranking professor. He has published over 200 articles and monographs in the field of developmental education as well as four related books (*Objective Mental Measurement, Foundations of Developmental Education* and the *Handbook of Developmental Education* published by the Greenwood Publishing Group as well as *Cognitive Styles* published by the Mellon Research University Press). Dr. Hashway has received numerous honors for leadership in Higher Education and is included in *Who's Who in America*.

Karen Sue Cain earned her BS degree in mathematics from Berea College and an MA degree in education with emphasis in mathematics from Eastern Kentucky University. She is currently a Senior Research Associate with the *Educational Research Quarterly* at Grambling State University and a doctor of education student with emphasis in developmental education at Grambling State University. Ms. Cain has been an instructor and coordinator of developmental mathematics programs at Berea College and Eastern Kentucky University since 1974. For the past six years she has conducted the Developmental Mathematics Program at Eastern Kentucky University which has enrollments of 2,000 students per semester. Ms. Cain is coauthor of the text *Measurement Geometry*, second edition and has written the *Supplement* to accompany *Prealgebra* by Charles P. McKeague. She has presented papers and conducted workshops at many conferences. Current research centers on the learning disabled student in the post secondary classroom.

Wilton A. Barham is an associate professor of education in the department of Educational Leadership and Habilitative Services at Grambling State University. He teaches graduate courses in educational statistics, research methods and design in the graduate program in developmental education. Dr. Barham received a B.S. in mathematics from the State University of New York, College at Oneonta; an M.P.H. in biostatistics from the University of Michigan-Ann Arbor; and a Ph.D. in educational statistics, research methods and design also from the University of Michigan-Ann Arbor. For the past twenty-two years he has held positions as an instructor, researcher and administrator in the area of developmental education at The State University of New York-Oneonta, The University of Michigan-Ann Arbor, The University of Chicago and Grambling State University. He participates in many individual and collaborative research activities and has published research articles in the areas of developmental education and educational research methods. His research interests include the investigation of the impact of teaching and learning strategies on students' academic performance, impact of study behaviors on students' learning, curricula issues related to the teaching and learning of statistics, and multivariate statistical modeling in education.

Vernon L. Farmer earned his Ph.D. from the University of Michigan where he studied Higher Education Administration and Management at the Center for the Study of Higher Education. He also earned his B.A. and M.A. degrees at the University of Michigan. Dr. Farmer has committed the past twenty years of his career to the field of Higher Education, and has provided extraordinary insight to the evolving field of Developmental Education. He has demonstrated academic leadership at a number of colleges and universities in the United States, including the University of Michigan and the State University of New York systems. Dr. Farmer has contributed to the body of research, both in Higher Education and Developmental Education. Currently, he is writing a book concerned with Cultural Pluralism in Higher Education. He is also conducting research to write another book on the History and Philosophy of Developmental Education. Dr. Farmer has served as Head of the Department of Educational Leadership and Habilitative Services and Director of Doctoral Studies at Grambling State University which houses the nation's only doctoral program in Developmental Education.

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